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A circular economy approach for lifecycles of products and services

Living Labs Concepts and Implementation Plan for CIRC4Life-project

Deliverable 7.1.

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Summary

Deliverable 7.1. provides a common framework for the Living Lab approach in CIRC4Life project and presents the Living Lab concepts developed for circular economy, which are to be utilized in WP1, WP2 and WP3. The Living Lab follows a cyclical approach, where different scenarios, the possible 'future states' are tested in a real-world context, and solutions evolve through multiple iteration rounds.

This document defines the specific characteristics to be considered when applying the Living Lab methodology as well as the different roles and responsibilities during the Living Lab process. The guidelines presented in this deliverable form an overall methodological approach to be utilized in the Living Labs within the Circ4Life project.

Living Labs can be defined as

*"User-centred, open innovation ecosystems based on **systematic user co-creation approach**, integrating research and innovation processes in **real life communities and settings**. They operate as intermediaries among citizens, research organisations, companies, cities and regions for joint value co-creation, rapid prototyping or validation to scale up innovation and businesses. Living Labs have common elements but multiple different implementations."* (ENoLL).

In CIRC4Life project, the Living Labs are used as a framework for involving actual customers and other key stakeholder in the collaborative innovation process. The development of the Living Labs is considered a co-creational iterative development process that facilitates stakeholder engagement and is based on the concept that organisations instead of utilising only in-house resources could use external ideas to develop their products and services.

The concept of a Circular Economy (CE) is based on interconnected companies that form infrastructure and economy, coming together and re-thinking the operating system itself. In this sense CE forms an ecosystem to solve complex problems, which cannot be solved by individual companies and organisations. Living Labs help improve the pivotal multi-stakeholder collaboration in CE ecosystems. These collaborations also involve citizens, scientists, companies, cities and other public authorities and policymakers, as well as civil society and third-sector organisations contributing to the joint knowledge, innovation and value creation processes.

The Living Labs engage cross-disciplinary expert teams and ordinary people with their different roles (as users, enablers, designers, entrepreneurs, activists, etc.) in every phase of an open participatory RDI process; from the identification and definition of a challenge, the concept or prototype design and the experimentation, towards the pre- and post-launch of a novel product, service, social innovation or other solution. Open and participatory RDI and continuous experimentations enable Living Labs to guide the technological product and business design processes towards socially, ecologically and ethically sustainable solutions. (Hirvikoski, T. et al. 2018)

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Acronyms and abbreviations

Abbreviation	Description
LL	Living labs
CE	Circular Economy
CEBM	Circular Economy Business Models
SD	Service Design

1 Introduction

1.1 CIRC4Life-project in brief

CIRC4Life (No 776503) is a three-year project commencing in May 2018, supported by the European Commission H2020 circular economy programme, with a project budget of 7.3 million Euros. The project will develop three new circular economy business models (CEBMs), including 1) co-creation of product and services, 2) sustainable consumption and 3) collaborative recycling and reuse. The CEBMS will then be demonstrated in four industrial sectors including LED lighting products, vegetable farming, meat supply chain, and recycle/reuse of tablets.

1.2 The aim of this document

Deliverable 7.1. provides a common framework and implementation plan for Living Lab approach in CIRC4Life project. These guidelines are written to support CIRC4Life-project demonstrations to co-create, test and validate their three circular economy business models (CEBMs) with the help of the iterative and multi-stakeholder Living Lab approach. The Living Lab and demonstration plans in combination will be used for communicating what kind of development and testing of actions in practice will be executed during the CIRC4Life project, and how various actors will take part in these actions.

As a result, this deliverable forms an overall methodological approach to be utilized in the Living Labs within the CIRC4Life project. Furthermore, the specific characteristics to be considered when applying the Living Lab methodology as well as the different roles and responsibilities during the Living Lab process are addressed.

1.3 Living Labs in context of Circular Economy

The concept of a Circular Economy (CE) is based on interconnected companies that form infrastructure and economy, coming together and re-thinking the operating system itself. In this sense CE forms an ecosystem to solve complex problems, which cannot be solved by individual companies and organisations.

The Living Lab approach follows a cyclical approach, where different scenarios, the possible 'future states' are tested in a real-world context, and solutions evolve through multiple iteration rounds (Figure 1.). The Living Lab approach helps to improve the pivotal multi-stakeholder collaboration within CE ecosystems. These collaborations involve scientists, companies, cities and other public authorities and policymakers, as well as civil society (a.k.a. citizens and various types of consumers) and third-sector organizations contributing to the joint knowledge, innovation and value creation processes. As a result, the Living Lab approach is considered to be an open innovation development approach in which in-house and external resources are combined to deliver novel solutions. The Living Labs engage diverse actors and stakeholders across the innovation process starting from the identification and definition of a challenge, the concept or prototype design and the experimentation, towards the pre- and post-launch of a novel product, service, social innovation or other solution.

1.4 How were these guidelines developed?

The guidelines have been developed in close collaboration with the CIRC4Life demonstrations and various other stakeholders during the first ten months of the CIRC4Life-project. The guidelines are a combination of best practices and prior scientific discoveries, which have been adapted to the CIRC4Life demonstration context in order to meet demonstration needs for acquiring market information. Figure 1, the key elements of CIRC4Life Living Labs presented above are implemented through the phases of Open Innovation.

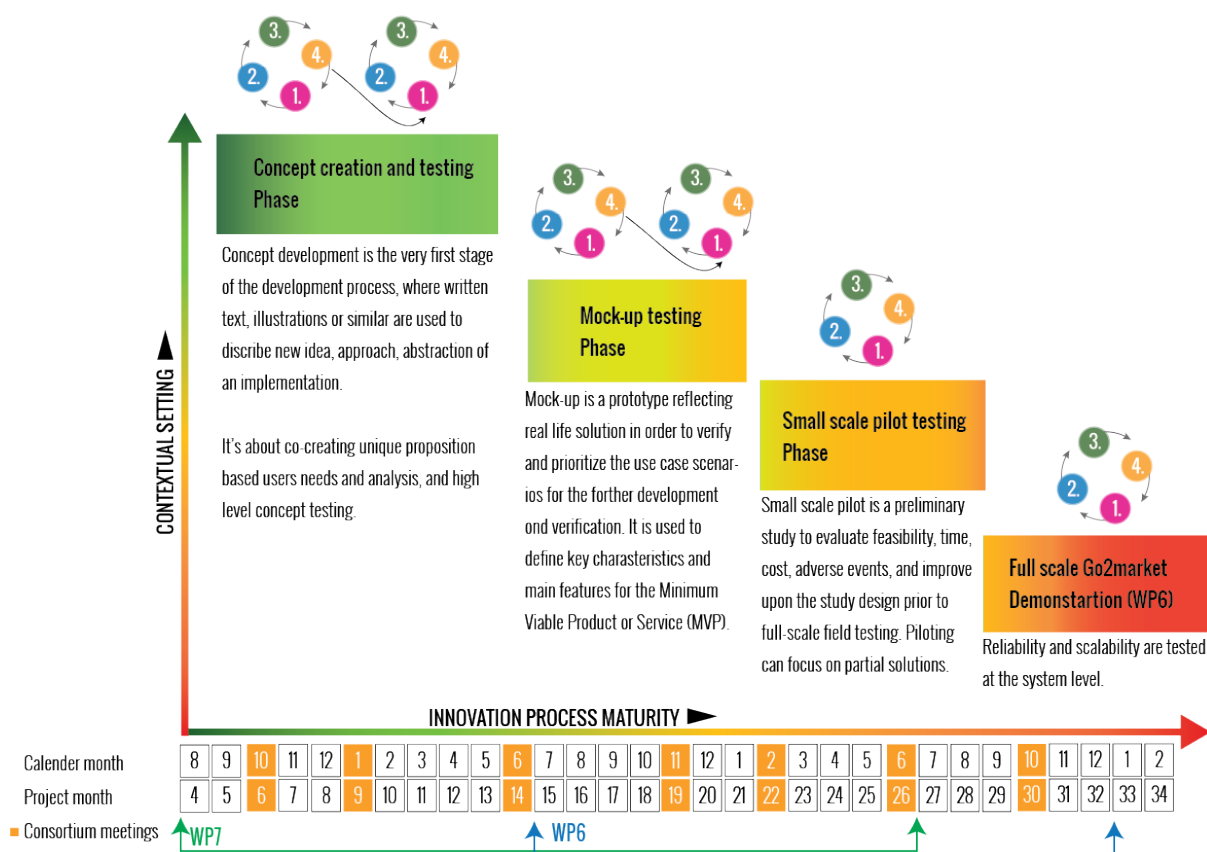


Figure 2: Key elements of Circ4Life Living Labs implemented through the phases of Open Innovation

2 CIRC4Life-project business model and demonstration activities

2.1 Circular Economy Business Models (CEBMs) in brief

The following three Circular Economy Business Models (CEBMs) illustrated in Figure 1, will be developed during the CIRC4Life project by utilizing the Living Lab approach.

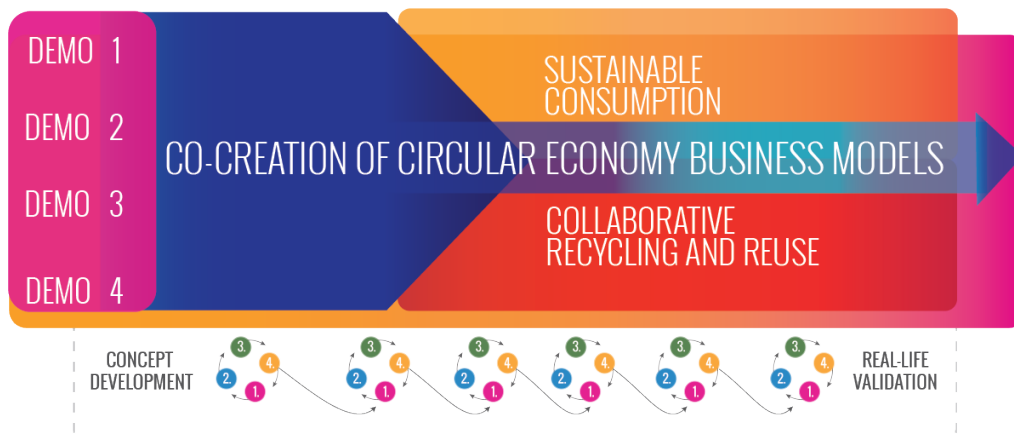


Figure 3: Key Circular Economy Business Models (CEBMs) in CIRC4Life-project

(A) Co-creation of Products and Services with end-users: Bringing end-users and other key stakeholders closer to the product and service development by identifying their preferences via various inclusive research and development methods and empowering them by utilizing the Living Lab approach in real-life settings. The key aim of the Living Lab activities is to specify and test how various co-creation methods and activities in different stages of innovation process from idea generation to concept development, mock-up testing, small scale piloting and finally to full scale go2market field testing can be adapted to CIRC4Life context. The key challenge to be solved during the Living Lab activities can be defined as follows:

What are the best ways to bring together end-users, key stakeholders and CIRC4Life demonstrators to co-create novel solutions for all the stages of circular economy?

(B) Collaborative Recycling/Reuse: Developing a system so stakeholders can interact with each other in order to facilitate the use or reuse of end-of-life products, reduce waste, and implement the eco-credits awarding scheme to encourage end-users to recycle or reuse. To conclude:

What are the key characteristics, challenges and opportunities when developing and forming interconnected infrastructures for circular economy in context of CIRC4Life demonstrations?

(C) Sustainable Consumption: Developing and implementing a method to calculate the eco-points for products by: (1) Assessing Product Environmental Footprints, (2) Providing a traceability solution to monitor the sustainability of products along the value chain and (3) Supporting end-users and stakeholders to actively implement the circular economy via awareness raising and knowledge sharing activities. To conclude:

How to engage and motivate consumers and B2B-customers to make more sustainable purchase decision?

2.2 CIRC4Life Demonstrations in brief

The CEBMS will then be demonstrated in four industrial sectors including LED lighting products, vegetable farming, meat supply chain, and recycle/reuse of tablets.

DEMO 1A: Domestic lighting products manufactured by ONA aims to co-create lamps with recycled or recyclable components and encourage sustainable consumption by showing the eco-points information of their new lamps. Collaborative recycling will be demonstrated by extending the lighting products recycling practices to end-users, enabling citizens to separate and recycle their lamps produced by Ona.

DEMO 1B: Industrial lighting products manufactured by Kosnic, Newbury, UK aims to develop a modular LED industrial lamp and a leasing service covering the whole life-cycle of the lighting solution in order to reduce waste, and reuse, recycle and remanufacture the returned lamps.

DEMO 2: Tablet recycling by Indumetal recycling is demonstrating an efficient and traceable collection system for tablets' reuse and remanufacturing. The collection system is supported by an incentive scheme and various awareness raising and marketing campaigns.

DEMO 3: Micro farming by Scilly Organics aims to co-create various sustainable food products by transforming raw farming products into LCA analysis validated eco-friendly food products. Applying community engagement by establish community composting for "green" bio waste, which will be used for restoration purposes.

DEMO 4: Meat product by ALIA, aims to define and implement green procurement processes, which defines sustainability criteria for the selection of suppliers. A traceable supply chain enables real-time data collection on the environmental impact of the meat supply chain at every stage, from farm to processing to consumer to recycling bin to new alternative products made from recycled meat. Loyalty and donation programs based on eco-points are introduced to support purchasing and recycling of the sustainable meat products.

2.3 Eco-point approach in brief

CIRC4Life is based on the "eco-point" approach, which helps consumers to understand the ecological impacts of products (and services). Products produce negative ecological impacts, such as pollution on the environment, harmful gas emission, and negative impacts on eco-systems and human health. The ecological impact of a product can be measured and monitored with a numerical value based on the eco-point approach, which demonstrations will implement during the CIRC4Life project. The key elements of the "eco-point" approach are as follows:

An **Eco-point** is a cumulative value, which accounts for an aggregate of ecological impacts throughout the product's whole supply chain. The Eco-point, which is an absolute value, is produced via utilizing the method of life cycle impact assessment (LCIA). Each product is associated with an eco-point, which is calculated through the product value chain, in which the use stage is included.

An **Eco-debit** shows the customer's negative ecological impact resulting from the products purchased. Since an eco-debit represents a negative impact, it is assigned with a negative sign '-' to an eco-point.

Eco-credits are used to reward the customer's positive behaviour in recycling products which reach their end-of-life (EoL) or end-of-use (EoU) stage. In other words, customers will receive eco-credits when they recycle products. In contrast to the eco-debit, the eco-credit is a positive value, which reflects the positive behaviour of consumers via recycling/reuse activities.

Eco-account and Eco-balance enable consumers to track their daily footprints on environment by recording their purchasing (eco-debit) and recycling (eco-credit) activities into a single account. Within the eco-account, the product's eco-debits are traded off by eco-credits; in other words, the eco-debits can be offset with the eco-credits which the consumers earn via recycling their products. The eco-balance is calculated based on the sum of the eco-debits and eco-credits earned, resulting in the value of eco-balance.

Eco-shopping enables consumers to view the eco-points and sustainable manufacture information of the products by using their smartphones in the stores (or reading the printed labels). Consumers scan the RFID/NFC tags to obtain the product's sustainable information¹, which will help the consumers to select more sustainable products. When the consumer pays the products, the products' eco-debits resulted from purchasing are recorded in the consumer's eco-account.

Eco-accounting infrastructure is to implement the information and communication technologies (ICT) to collect and process the data for the calculation of eco-points, and then apply the eco-points obtained into the different areas, with the special concerns of sustainability, including eco-shopping, recycling/reuse, consumer's eco-account, and product sustainability assessment.

¹ Doubts were expressed during the Innovation Camp regarding the likeliness of such a scenario: While consumers might take the time to scan with their smartphone for some expensive purchases (such as appliances or electronics), they will be highly unlikely to do this when shopping for food in the supermarket. The information should rather be clearly visible on an eye-catching label (CEPS reviewer, 25.02.2019)

3 CIRC4Life approach for Living Labs

Living Labs as an open innovation approach provide a general iterative framework for conducting research and development in the real-world, where end-users and other relevant key stakeholders work together in order to identify challenges and opportunities, and to co-create, test and validate novel solutions.

3.1 From closed innovation to open innovation

Nowadays, organisations are rarely capable of innovating fully independently and therefore the innovation process has become more and more of a joint organisational effort, instead of an isolated effort by individuals or individual organisations. Importantly, partners within an open innovation network, which can also be described as an ‘innovation ecosystem’, should provide the resources and capabilities that their own organisation lacks.

The shift from closed innovation practices to an open innovation approach was initially grounded in the “Triple helix”, the description of the cooperation and interactions between university, government and industry in research and development context (Etzkowitz & Leydesdorf, 2000). The Open Innovation 2.0 and the Living Lab approach have shifted the scheme from Triple Helix into the Quadruple Helix, by adding the user as the 4th main stakeholder. (Alcotra Innovation experience handbook, 2013)

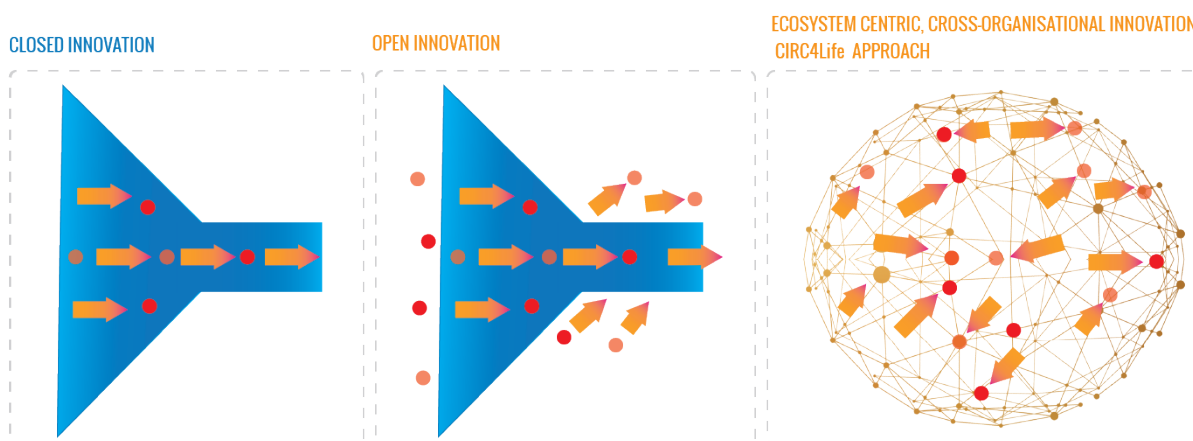


Figure 4: The evolution of innovation. Modified from Curley, M. & Salmelin, B. 2013

3.2 Fundamental differences between closed and open innovation

Innovation: Innovation is production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and the establishment of new management systems. It is both a process and an outcome. (Edison, H. et al. 2014).

Open Innovation: The concept of open innovation was first introduced by Henry Chesbrough in his book, “Open Innovation: The new imperative for creating and profiting from technology” (2003) and is used to describe the innovation process, which implies a multiplicity of actors and external cooperation that flows across organisational boundaries.

Open Innovation 2.0 (OI2): The concept of open innovation has evolved into a new paradigm, Open Innovation 2.0, which considers the user (customer) as an active actor in an open multi-stakeholder innovation ecosystem

and as a co-creator of value. The concept of OI2 is built upon co-rated shared value, innovation ecosystems, integrated collaboration and unleashed exponential technologies. (Curley, M. & Salmelin, B. 2013)

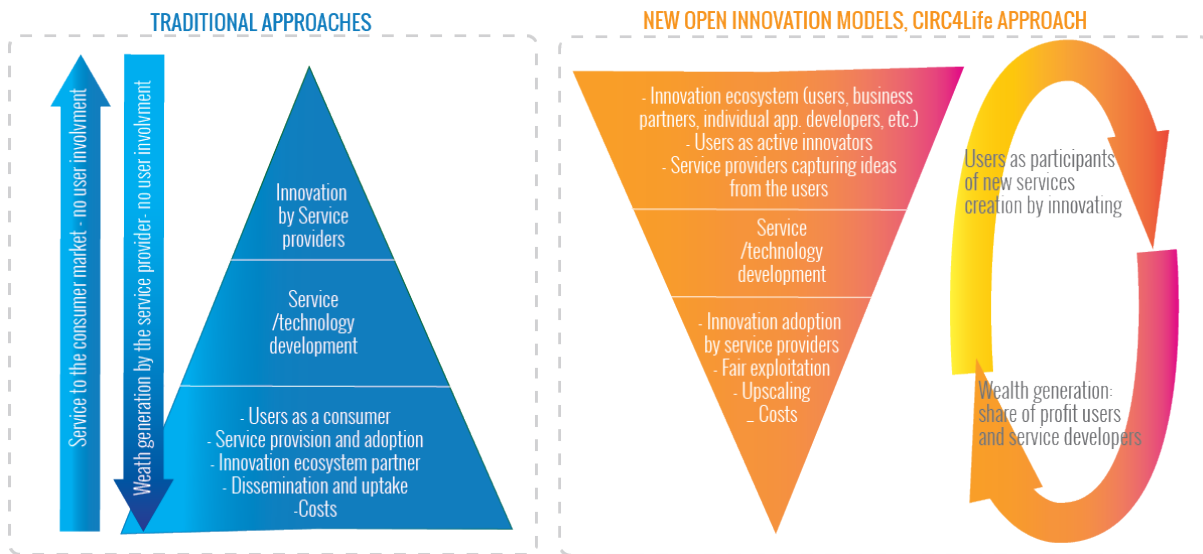


Figure 5: The comparison of traditional and OI2 approach. Modified from Curley, M. & Salmelin, B. 2013

3.3 The key elements of Living Labs

While Living Labs can be described in many ways and serve several purposes, the following five key elements described in Figure 5. are forming the foundation for CIRC4Life Living Lab activities.



Figure 6: Key elements of the Living Labs

Real world context: Living Lab activities are occurring in simulated or in real-world contexts. In practice this means that the various solution alternatives for the new product and service ideas are co-created, tested and validated from early on in the development process, by their potential users in their natural usage-environments.

Multi-stakeholder participation / Quadruple Helix approach (Open Innovation 2.0 - A New Paradigm, EU Open Innovation and Strategy Policy Group, 2013).

A wide ecosystem of actors, consisting of all relevant stakeholders from end-users to employees and value chain partners, are involved throughout the innovation process. The harmonized participation of all the main stakeholder groups is referred as a Quadruple Helix and includes the following four main stakeholders groups, which each are able to benefit from the Living lab process in different ways.

- **Business / Companies** such as manufacturing and services within the value chain, primary sectors, financial sector, creative industries, social sector, large companies, SMEs, cluster and business organizations, business driven associations, etc.
- **Research and education (Academia)** including public and private research bodies, primary schools, universities, public and private education and training, science and technology centers, technology transfer officers, etc.
- **Public Sector** including government, EU regulators, municipalities, public procurement officers, incubators and
- **Civil Society / Users / Consumers** including NGOs, citizens and users related to the three circular economy business models, as well as current and possible future customers of the demonstrating companies

User-engagement: Living Labs seek to identify user-centric solutions, opportunities and challenges. Involving the users already in the beginning of the development activities and across the whole innovation process is a key element of the Living Lab process.

Multi-method approach: As all Living Labs are unique, there isn't a single Living Lab methodology that can be replicated and applied. This means that series of different Service Design approaches and co-creation methods that best fit their purpose are selected and implemented during the different Living Lab phases, as the requirements and solutions evolve during multiple iterative development rounds. (Ståhlbröst, A. Holst, M. 2012)

Co-creation: Co-creation is identified as the central process of the Living Lab approach. It can be defined as a cooperation between different actors or stakeholders who share the same overall objective or goal. It is about planning, developing and innovating new solutions through a specific iterative development process while utilizing various methods, techniques and tools. Through a co-creation approach, diverse teams together with end-users can collaboratively identify needs, ideas, experiences and opportunities and generate fast prototypes to be tested and validated by the real users and other relevant stakeholder. The original co-creation definitions were mainly focusing on the co-creation of value by a firm's customers, but lately co-creation is more often also described as a collaboration between various Quadruple Helix actors (Arnkil et al. 2010). Therefore, the co-creation in context of CIRC4Life Living Labs is including all Quadruple Helix actors.

4 CIRC4Life Living Lab key actor roles and actor engagement strategy

4.1 CIRC4Life partner roles

Management and Coordination/Orchestration – Laurea University of Applied Sciences (LAU)

Orchestration and facilitation (i.e. management) of the various stakeholder interactions within CIRC4Life Living Labs is conducted by Laurea University of Applied Sciences (LAU). The management activities focus on defining and designing activities and structures that will most cost-effectively contribute to the value creation in order to meet CIRC4Life objectives as defined in the grant agreement. A facilitator (LAU) builds a dialogue between various actors, prepares for the innovation process and coaches and motivates the Living Lab activities participants. In practice, LAU's responsibilities and tasks as a facilitator/orchestrator include:

- Planning of the overall and individual Living lab activities together with each demonstrating company, based on the input from the first ACSI events and the input from the project partners
- Revising the demonstrator specific Living Lab action plans in each consortium meeting together with the demonstration owners, based on the results from a previous phase
- Supporting the selection, engagement and involvement of end-users and other key stakeholders during the Living Lab activities.
- Analysing and reporting the individual Living Lab activities and eventually combine all individual results into D7.2

Demonstration (1 to 4) owners – KOS, ONA, JS, IND, ALIA, REC

Demonstration owners (KOS, ONA, JS, IND, ALIA, REC) are responsible for defining and implementing demonstration activities according to CIRC4Life grant agreement. Alongside these activities, demonstration owners are also

- Delivering all the relevant background information and materials relating their demonstration and demonstration ecosystem.
- Defining a series of alternative scenarios and open questions to be tested and answered via various Living Lab activities. Based on these, demonstration owners and Living Lab Orchestrator in collaboration define a prioritized list of Living Lab activities in order to meet the budget restrictions.
- Identifying, recruiting and engaging end-users, value chain partners, and other relevant stakeholders to take a part to Living Lab activities based on the guidance provided by the Living Lab Orchestrator.

Demonstration coordinator, RISE

The CIRC4Life demonstration coordinator (RISE) is responsible for coordinating and managing demonstration activities as a whole and to make sure that individual demonstrations are following the CIRC4Life project plan and providing their demonstration plan and the descriptions in a timely manner for the Living Lab Orchestrator. Furthermore, demonstration coordinator is helping the Living Lab Orchestrator to find synergies between individual demonstrations in order to arrange joint Living Lab activities whenever it is possible.

CIRC4Life other partners roles in Living Lab activities

Other CIRC4Life partners beyond demonstration owners and demonstration coordinator are contributing to Living Lab activities by providing various deliverables, which are prerequisite to execute Living Lab activities in a real-life setting. Among these are for example ICT infrastructure and Eco-point solutions, which are used to assess and trace the sustainability of the value chain.

4.2 Ensuring actor diversity for enhanced creativity

The aim of the end-user and other relevant stakeholder engagement is to increase the participants diversity. As a term, diversity can be basically associated to any attribute to indicate that another thing, person, group,

organisation, network or ecosystem is different (adapted from Williams and O'Reilly, 1998). In the case of Cir4Life Living Lab activities, the aim is to ensure:

- 1) **Cultural diversity** by inviting geographically dispersed and culturally-mixed actors
- 2) **Organisational diversity** by inviting actors from all quadruple helix organisations
- 3) **User-driven diversity** by inviting end-users (or members of established end-user/consumer organisations) with diverse consumption backgrounds. Furthermore, one of the main principals of user selection is to involve both, the actual and existing users as well as users from possible new groups. Additionally, involvement of users who would not use services should be considered, as they are able to provide valuable controversial viewpoints.
- 4) **Cross-functional diversity** by inviting actors who have different job profiles
- 5) **Disciplinary/cross-industry diversity** by inviting actors from different industries

4.3 The key principles for actor recruitment

It is emphasized that Living Lab Orchestrator Laurea is responsible for defining the required actor groups, but demonstration owners are responsible to recruiting the actors for their demonstration and Living Lab activities in collaboration with other CIRC4Life partners. In practice the recruitment process is conducted via CIRC4Life project consortium's existing networks in each demonstration location, in order to find intrinsically motivated and talkative users who are willing to join the CIRC4Life co-creation community. Furthermore, to support the community building process, the intensity and coverage of end-users' involvement is systematically collected and measured during the all-user engagement activities, evolution trends are investigated, and corrective actions to operational procedures are executed when needed.

Each Living Lab activity includes a plan defining the amount and descriptive profile of the participating actors. In order to be able to select people who are suitable for the development of the activities presented, few guidelines to take into consideration are suggested below (modified from Sthåhlbröst & Holst 2017):

- Rewarding users for their involvement is not recommended but can be done if needed. Finding a combination of different motives, for example the four Fs: fun, fame, fortune and fulfilment should be considered first
- Although most of the stakeholders do not feel the professional motivation to take part in such voluntary work, a connection should be developed with the people concerning a specific problem or an envisioned solution so that the stakeholders find it relevant
- The participation should be voluntary
- All ages should be represented
- Aiming towards a balanced gender representation is highly recommended. It has been discovered that participation of males has traditionally led into focusing more on the technical performance of the products, whereas a female participation has resulted in more focused development upon human needs.
- Users who are the least knowledgeable about the area as well as the lead users (users that will face needs that will be general in a marketplace – but face them months or years before the bulk of that marketplace encounters them, and will benefit significantly by obtaining a solution to their needs) should be focused on in the selection
- Aiming towards maximizing difference between selected user categories
- Select participants with great social competences and flexible mindsets. A single saboteur is able to vandalize and ruin the whole development process. If possible, recruit also opinion leaders (i.e people who influence the opinions, attitudes, beliefs, motivations and behaviours of others).
- Mix "internal" and "external" stakeholders

5 The main phases of CIRC4Life iterative Living Lab approach

5.1 Double Diamond model as a main foundation for the overall Living Lab planning

As described in Figure 6, CIRC4Life Living Lab approach loosely follows the Double Diamond Model (also known as 4 D) which was initiated by the British Design Council in 2005 and includes Discover, Define, Develop and Deliver stages (a.k.a The 4 D's).

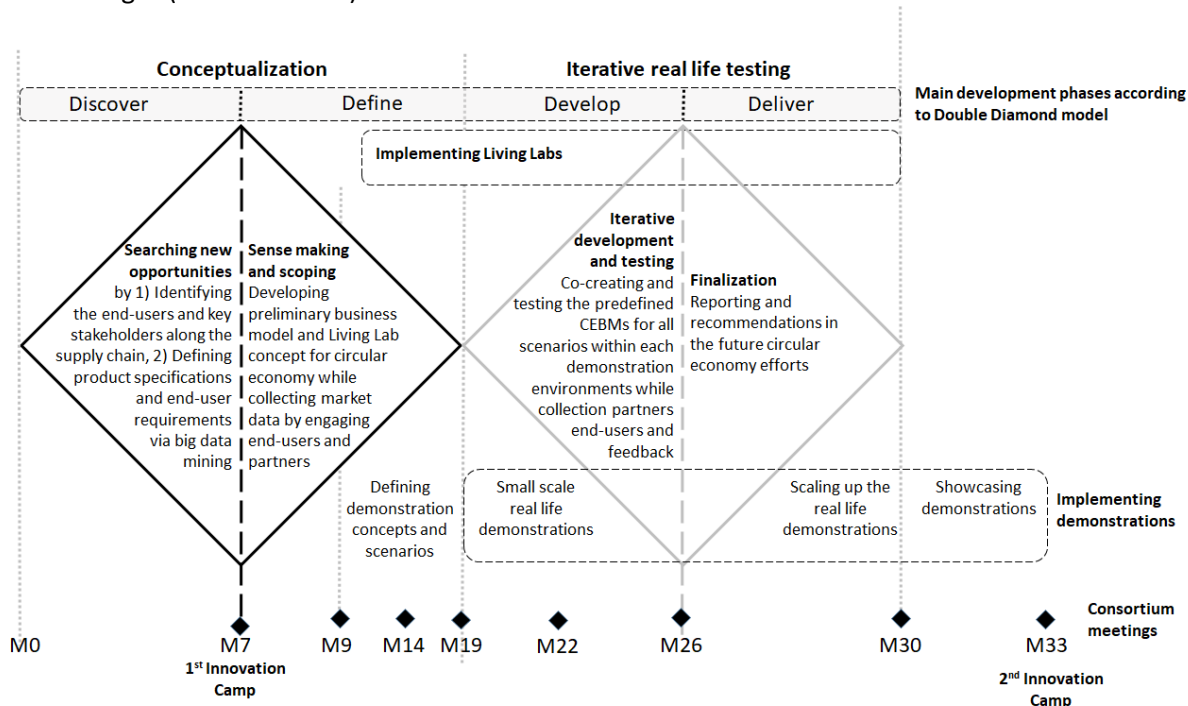


Figure 7: CIRC4Life Living Lab approach relationship to Double Diamond model

The first Discovery phase focuses on searching new opportunities by gathering various kinds of information and insights. In the second Definition stage the aim is to make sense of the identified possibilities while framing the scope for the business challenge. In this stage, the insights collected in the first Discovery phase are reviewed and selected for further development, rejection or returning to the previous stage. In the third Development stage, solutions or concepts are created, prototyped, tested via multiple iterations in the real-life demonstration environment in which various Living Lab activities are conducted in order to test and further develop the suggested solutions. In the final Deliver stage, the project results are finalized and launched. The 2nd innovation camp will be used for showcasing, disseminating and launching the developed solutions.

5.2 Iterative / Agile / Spiral development

Iterative / agile / spiral (later only iterative) development models can be defined as a set of development methods in which requirements and solutions evolve through multiple iterative collaboration rounds between cross-functional teams, end-users and other key stakeholders (Boehm, 1988, Stickdorn & Schneider, 2010). Iterative development approach promotes adaptive planning, evolutionary development, early delivery, continuous improvement, and encourages rapid and flexible response to change. The number and duration of the iterations varies depending on the development task. Most importantly, besides feedback to the next phase, the iterative development approach as illustrated in Figure 7. also includes the possibility to go back to one of the previous phases if needed.

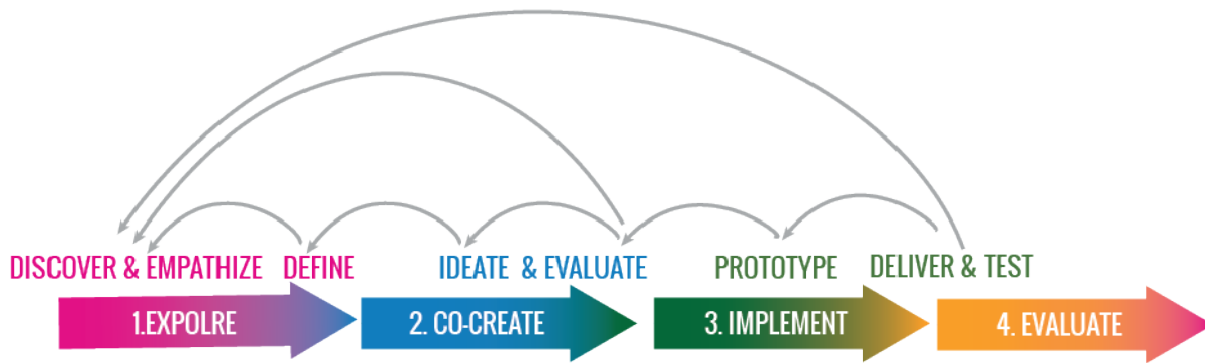


Figure 8: Going back process within iterative development process

5.3 Skeleton of each iteration round

During each iteration round, the following phases described in Figure 8 are conducted:

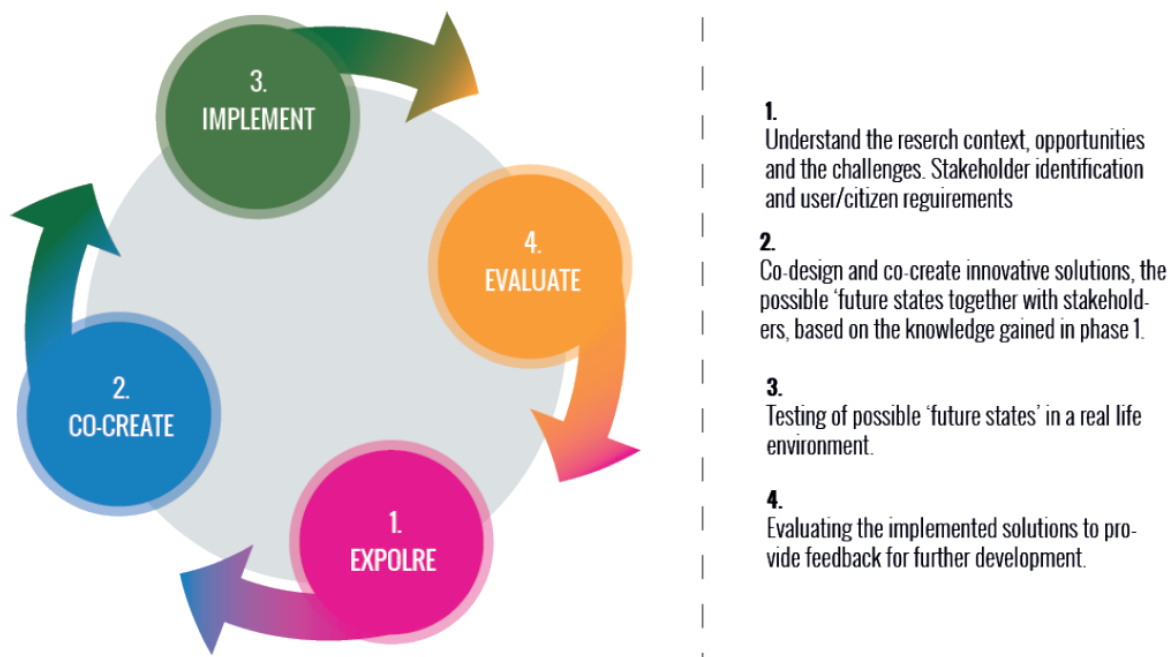


Figure 9: Phases during single iteration round

Phase 1: Explore & Define: Each iteration round starts by identifying problems and opportunities and understanding the context on the basis of previous phase discoveries. This means understanding the 'current state' of the operating environment and creating an overview of the problems, habits and practices of the targeted users and other stakeholders. One of the main aspects of the exploration phase is stakeholder identification for the suggested Living Lab activities. After gaining understanding about the different stakeholders and their context, varying research methods and techniques and service design tools are selected to gain understanding and knowledge of the deeper levels of user needs and requirements.

Phase 2: Co-Create: The second phase can be labelled as Co-creation. This phase is about co-developing and co-designing concepts and novel solutions based upon the knowledge gained in the previous rounds as well as

Phase 1. Together with users and other key stakeholders, the knowledge gained is transferred into scenarios/hypotheses that can be referred as possible 'future states'. The leading ideas and scenarios are then materialized into concrete concepts that can be co-designed and co-developed further. During this phase, users and other stakeholders can make the strongest contributions by actually setting the direction for the design of solutions.

A planning of solutions and scenarios for each demonstration case will be done during local Living Lab activities in UK (Cornwall and Berkshire) and in Spain (Regions of Murcia, Basque Country and Valencia), involving demonstrators and value chain-specific stakeholders as well as citizens and local communities. The scenarios created are then materialized into concepts that can be developed and elaborated into prototypes and tested in a real-world context during the next Implementation and Experimentation phase.

Phase 3: Implement & Experiment: The Implementation and Experimentation phase will correspond to actual demonstration activities (WP6) in the CIRC4Life project. The ideas and solutions that were materialized into concepts in the previous co-creation phase are put to the test by developing and experimenting with different prototypes in a real-world setting. These prototypes can take many different forms, from visualizations and storyboards to tangible Minimum Viable Products (MVPs). However, the main goal is to facilitate testing of the scenarios created. As this phase aims to understand user reactions and attitudes towards the proposed solutions and to capture user behaviour, the experimentations should take place in "as-real-life-as-possible" contexts. However, in order to ensure cost-effectiveness, the real life simulations can also be used. The maturity of the design/prototype defines the degree in which real life setting can be attained. During this phase, local Living Lab activities are set up in UK and in Spain, involving demonstration-specific stakeholders as well as citizens and local communities. In addition, similar activities can also be executed in other places in order to follow the participant diversity principles.

Phase 4: Evaluate & Analyse: The third and final stage consists in evaluating implemented solutions to provide feedback for further development. As the previous stages provided a knowledge regarding the 'current state' of the end-users and simulated an envisioned 'future state' by means of an intervention, the evaluation stage enables to generate a 'post-measurement' of the intervention and compare it to the 'pre-measurement' benchmark, illustrating potential impact and added-value created by the implemented solutions. Qualitative and quantitative feedback from users will also be collected and used for the next iteration. Upscale opportunities and knowledge transfer will be exploited as a part of the impact evaluation.

6 Methods and tools

There isn't a single Living Lab methodology that can be replicated and applied for the CIRC4Life project. This means that Design Thinking and series of different Service Design approaches and co-creation methods that best fit their purpose are selected and implemented during the different innovation process phases. It should be noted that the tools and methods presented should not be taken as a definite guideline when planning the Living Lab activities, but rather as a general framework to be modified to suit the purpose of each demonstrator and their specific requirements. Information and guidance for stakeholder engagement and for usage of the tools are provided by Laurea University of Applied Sciences throughout the project.

6.1 The Circular Design Guide by Ellen MacArthur Foundation and IDEO

Recently the Ellen MacArthur Foundation and IDEO collaborated to develop [The Circular Design Guide](#). The Guide introduces a set of tools and methods to understand, define, make, and release circular economy innovations. Since both the actors are established household names, it is expected that at least some of the suggested tools are relevant also for CIRC4Life purposes. In fact, some of the methods have a direct match to CIRC4Life project tasks. The suggested methods are classified under the following groups:

Understand <ul style="list-style-type: none"> • Understanding Circular Flows • Regenerative Thinking • Service Flip • Inside out • Inspiration: Digital System • Learn from nature 	Make <ul style="list-style-type: none"> • User-Centered Research • Circular Brainstorming • Embed Feedback Mechanisms • Smart Material Choices • Concept Selection • Rapid Prototyping
Define <ul style="list-style-type: none"> • Define your challenge • Find Circular Opportunities • Building Teams • Circular Buy-In • Circular Business Models • Create Brand Promise 	Release <ul style="list-style-type: none"> • Product Journey Map • Launch to Learn • Imagine New Partnerships • Create your narrative • Align Your Organisation • Continuous Learning Loop

6.2 Generic service design and co-creation methods and tools

There are also multiple other service design tools available, such as the [Lean Service Creation](#) and [Lean Brand Creation](#) by the Finnish company Futurice. These tools provide easy to use and understand support for co-creation. In general there are numerous methods, tools and approaches for conducting Living Lab projects. In the following section, a number of common approaches are described:

Workshops

Workshops are events where group of people work together and engage in intensive discussions in order to explore or create solutions for a particular subject of topic. Workshops usually have predetermined structures that supports achievement of the shared goals, and a facilitator who takes care of the social process and helps the group to understand their shared objectives and solve challenges together.

Observation / Shadowing

Observation / Shadowing is a method where the user's behaviours and interactions are observed in a real-use environment of the product /service by a passive observer. The method is suitable for investigating and developing already existing services/products, as it provides holistic and contextualized information about user behavior, and helps to identify possible problems within the services or products. This observation method can provide rich understanding about users motivation, and reveal the differences between users intended actions and the actual behaviour (what they say they do, and what they actually do). (Czarniawska, B. (2007).

Guidelines for observation method:

- arrange permissions
- follow the individual user closely, while writing notes
- documentation should be done carefully, filming is recommended
- remain as a passive observer through the process, don't provide comments or guidelines

Interviews

Interviews can be defined as a qualitative research technique, where usually a small number of respondents are interviewed individually or in small groups, to explore their perspectives on particular idea, concept or situation. Interviews can be conducted in a structured, semi-structured or unstructured format. (Boyce, C. & Neale, P. 2006)

User personas

User personas are fictional character used to define, represent and communicate user needs. Common way of developing personas is to gather research insights and make 'common-interest' groupings, which can be developed into several characters based on shared interest within groups. The fictional character should have picture, name and description of their personality, values and interests. This way the team developing the product or service is better able to empathize with the user needs and agree on the design drivers. (Stickdorn, M., & Schneider, J. 2010).

Survey

Survey is a research method where data is collected from a pre-defined group of people, to gather information about their interests and attitudes. Surveys can be conducted in different ways, depending on the methodologies chosen and the objectives to be achieved. (Fowler, F. Jr. 2012) The main survey data collection methods are:

- Online surveys
- Telephone surveys
- Face-to-face surveys
- Paper surveys

Figure 10 below presents a list of suitable tools during the different stages of the Living Lab process.

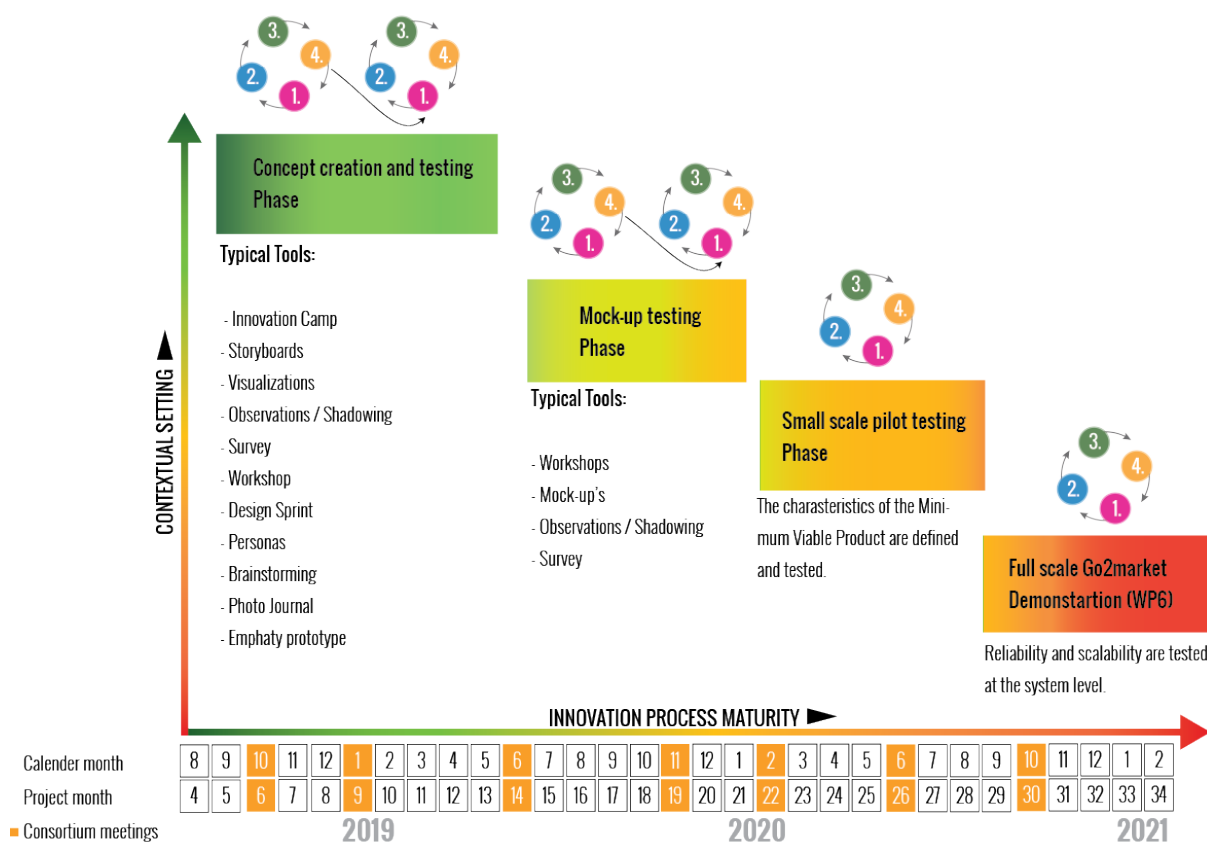


Figure 11: Methods and tools for different maturity stages

7 Overall Implementation Plan for CIRC4Life demonstration Living Labs

Key milestones and iteration rounds for Living Lab activities

All CIRC4Life demonstration and Living Lab activities will follow an iterative multi-step development approach, where the needs and requirements of the different end-users and stakeholders, as well as corresponding solutions evolve based on the collective development effort. Consortium meetings in which overall and individual Living Lab plans are refined and updated based on each round results, are forming the skeleton for iteration rounds as described in Figure 10.

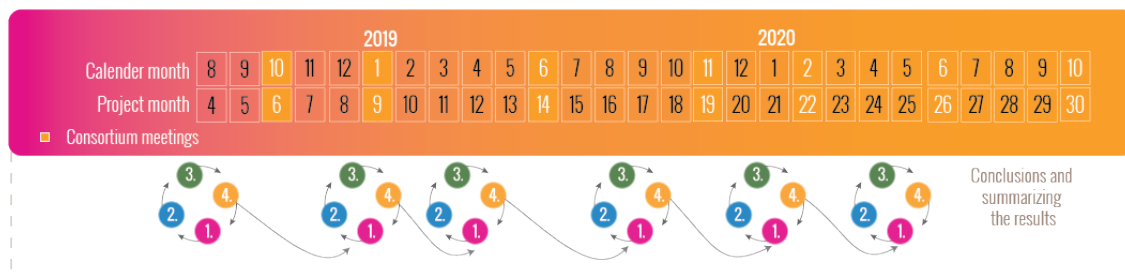


Figure 12: CIRC4Life iteration rounds

M0-M7: CIRC4Life Kick-off meeting (ROUND 1)

1) Preliminary description of the demonstration concepts, 2) definition of key open questions to be solved during the 1st innovation camp and 3) detailed planning and organisation of the 1st Innovation Camp.

M7-M9: 1st Innovation Camp (ROUND 2)

1) Concept refinement and modifications based on 1st Innovation Camp results, 2) refinement of the key questions to be solved during the Living Lab activities, and 3) overall planning of the Living Lab activities

M9-M14: Overall Living Lab planning and preliminary concept development (ROUND 3)

1) Finalizing the overall Living Lab activity plan, which will be continuously updated after each follow-up iteration round, 2) demonstration-specific Living Lab activity plans identifying the key demonstration activities and open questions that need Living Lab support, and 3) acquiring market and end-users needs for preliminary concepts and running limited mockup and prototype tests during the co-creation workshops

M14-M19: Refinement of demonstration concepts and scenarios based on market and end-user feedback (ROUND 4)

1) Finalize the co-created concepts and scenarios for each demonstration based on market feedback and workshop results, and 2) running limited mockup and prototype tests in order to ensure easy-of-use and understandability.

M19-M22: Real life demonstration activities with selected business partners (ROUND 5)

1) Validating and evaluating the co-created concepts and alternative options in real life demonstration settings, 2) Omitting the solutions which do have market acceptance.

M22-M26: Mid-term evaluation of the real life demonstration (ROUND 6)

1) Continue validating and evaluating the co-created concepts and alternative options in real life demonstration settings, and 2) scalability testing to ensure performance

M26-M30: Conclusions and summarizing the results

1) Summarizing and reporting the co-created concepts and alternative options in real life demonstration settings, and 2) Preparations for 2nd Innovation Camp and selecting the final showcases.

8 DEMO-specific Living Lab plans

8.1 DEMO 1A: Domestic lighting products plan

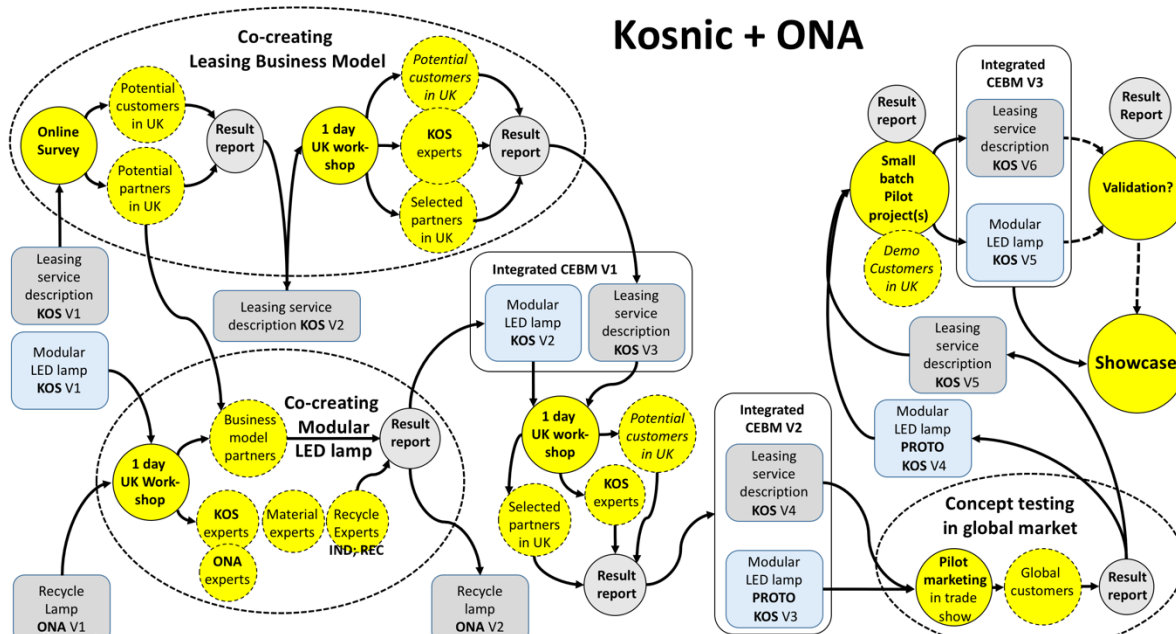


Figure 13: Domestic and industrial led lighting, Living Lab process

Timeline to be updated based on previous consortium meeting Excel and possible face-to-face meeting at the end of February.

M11: Visualizing sustainable information of products/eco-information

- **Timing / Duration:** March 27-28th 2019, Finland
- **Methods:** Circular Economy Jam
- **Target groups:** End-users (students, staff members, CE experts)
- **Key themes:** To show the sustainable information (eco-points) of products in different ways: package, to include (if positive) information of products possibilities of recycling and other sustainable/practical information.

M12-M14: Survey 1 – Consumer preferences relating recycling and buying lightning products

- **Timing / Duration:** April to May 2019
- **Methods:** Online survey (and limited amount of semi-structured interviews if needed)
- **Target groups:** Different kinds of consumers
- **Key themes:** 1) Respondent demographic profile, 2) generic recycling / sustainability attitude, 3) personal / family recycling profile, 4) understandability of the eco-point application based recycling process, 5) preferences for take-back scheme 6) preferences for incentive types

M13: Co-creation workshop 1 for developing recyclable products

- **Duration:** 1 day
- **Target group:** Recycling and material experts (incl. Recyclia) in collaboration with ONA experts

- **Location:** ONA facilities
- **Key themes:** Design and material selection for sustainable and recyclable lamp design.
- **Methods:** Brainstorming and mockup paper prototypes to co-create various lamp design alternatives and materials

M17: Co-creation workshop 2 for evaluating lamp prototypes and take-back scheme development

- **Duration:** 1 day
- **Target group:** Recycling and material experts (including Recyclia) and end-users
- **Location:** ONA facilities
- **Key themes:** Various lamp design prototypes alternatives are evaluated by the end-users and recycling and material experts, defining of the features and materials for the first product version. Take-back scheme development with end-users.

M17-M19, M22, M26: Awareness campaigns 1,2, and 3

- **Timing / Duration:** Campaign 1: September to November 2019, Campaign 2: February 2020, and Campaign 3: June 2020
- **Methods:** Awareness raising / marketing campaign to inform about recyclable products
To propose different ways and resources to develop awareness campaigns (for the whole circular economy cycle: social media, videos, NGOs, newspaper, radio etc)
- **Target groups:** Different kinds of consumers, general public
- **Key themes:** 1) eco-point based recycling system concept description, 2) incentives and take-back schemes
- **Additional info:** Each campaign will notify the feedback and observations from other activities and fine tune the message accordingly.

M21: Co-creation workshop 3: recyclable lamp V1 is tested with end-users

- **Duration:** 1 day
- **Target group:** End-users
- **Location:** ONA facilities
- **Key themes:** Lamp design is evaluated by the end-users, defining the features for the final product

M23: Small patch case study

- Upload new product(s) to ONA's website with the eco-point information
- **Target group:** End-users
- **Key themes:** Real life testing of the product(s), eco-information and the take-back scheme

8.2 DEMO 1B: Industrial lighting products plan

Main Living Lab activities and timeline

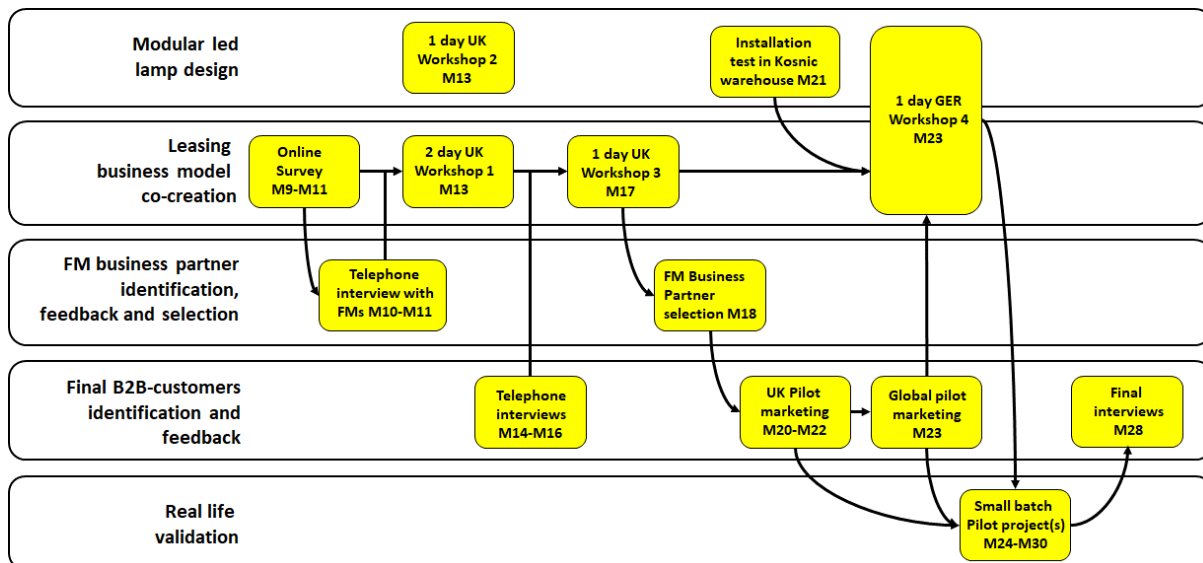


Figure 14: Industrial led-lightning, Living Lab process timeline

M9-M11: Online survey

- **Timing / Duration:** January 2019 – March 2019
- **Methods:** Online survey
- **Target group:** Kosnic existing customers as defined in their customer database + Selected Lighting Industry Association (LIA) members
- **Channels/Location:** Email posting + evaluating possibility to market the survey also on the Lighting Industry Association (LIA) website and their possible other channels
- **Key themes / Questions:** 1) Perceived importance of the environmental sustainability and strategic readiness, 2) current status of lighting systems, 3) perceived importance of the different lighting leasing services and options, 4) willingness to become leasing service business partner for Kosnic
- **Additional info:** Survey monkey cost is covered by Living Lab budget

M10-M11: Telephone interviews with FM companies

- **Timing / Duration:** March 2019
- **Methods:** Telephone interviews grounded on the preliminary leasing service business description and set of semi-structured questions
- **Target group:** Facility management companies across the UK (e.g. selected via <https://www.iwfm.org.uk/suppliers>)
- **Key themes:** 1) Description of the LED light leasing service, in which facility management companies become Kosnic business partner, 2) facility management company attitudes towards suggested business model, 3) business model benefits and problems from facility management company viewpoint, 4) identification of the potential customers or customer categories from facility management viewpoint (i.e. who would be the most potential end-customers) and 5) willingness to join co-creation workshop in partnership with Kosnic in May and/or September

- **Additional info:** Kosnic will hire a telemarketing / tele interview person who will make the cold calls based on ready-made interview structure and concept description. Living Lab budget is covering interviewer cost.

M13: Co-creation workshop 1 for develop leasing business model

- **Timing / Duration:** May 8th from 11.00 to May 9th 14.00
- **Methods:** Co-creation workshop while using various service design canvases, brainstorming techniques and mockups. The preliminary leasing service business model description is acting as starting point.
- **Target group:** Kosnic experts (3 person), facility management companies (2+2), wholesale company (2), Lighting Industry Association experts (5), contractor (2), Carbon Trust (1)
- **Location:** Lighting Industry Association (LIA), Stafford Park 7, Telford, Shropshire, TF3 3BQ
- **Key themes:** Testing and gathering new ideas, various thoughts and feedback on the Kosnic's Leasing Service business model. Identifying the 1) key functionalities and sales arguments for leasing service (online survey is used as starting point), 2) roles for each business partners, 3) revenue sharing model and 4) identification of the potential end-customer types
- **Additional info:** Accommodation for selected external participants are covered from Living Lab budget as well as lunch, dinner and refreshments for all participants. Laurea team will arrive on May 7th to do final preplanning with Kosnic team.

M13: Co-creation workshop 2 for developing modular LED lamp

- **Duration:** May 10th from 10.30(?) to 17.00 (?)
- **Target group:** Recycling and material experts in collaboration with Kosnic experts + interested participants from workshop 1a.
- **Location:** Lighting Industry Association (LIA), Stafford Park 7, Telford, Shropshire, TF3 3BQ
- **Key themes:** Design and material selection for sustainable and recyclable lamp design.
- **Methods:** Brainstorming and mockup paper prototypes to co-create various lamp design alternatives and materials

M14 –M16: Telephone interviews potential B2B leasing customers

- **Duration:** Between business model workshops 1 and 2
- **Target group:** Few potential B2B end-user customer which types and profile have been defined during the co-creation workshop 1.
- **Key themes:** Feedback on leasing business model B2B end-user customers
- **Methods:** Phone interviews (and onsite visits) by the Kosnic telemarketing person or facility management business partners

M17: Co-creation workshop 3 for develop leasing business model with interested FM business partners

- **Timing / Duration:** September 3th from 10.30 to 17.30 (?)
- **Methods:** Similar as co-creation workshop 1 but using more advanced leasing business model as starting point.
- **Target group:** Kosnic experts (3 persons), facility management companies across the UK who have clearly indicated an interest to become Kosnic business partners (amount of participants depends on the prior phases).

- **Location:** Kosnic premises OR Lighting Industry Association (LIA), Stafford Park 7, Telford, Shropshire, TF3 3BQ
- **Key themes:** Fine-tuning Leasing Service business model including 1) key functionalities and sales arguments for leasing service, 2) roles and UK regions for each business partners, 3) revenue sharing model and 4) identification of the potential end-customer types who will be contacted during the pilot marketing campaign
- **Additional info:** Living Lab budget covers lunch, and refreshments for all participants. Laurea team will arrive on September 2th to do final preplanning with Kosnic team.

M19-M22: Marketing campaign piloting

- **Timing / Duration:** Starting around November 2019
- **Methods:** Telemarketing and onsite visits by the facility management business partners
- **Target group:** Kosnic experts (3 persons), facility

M21: Prototype installation to Kosnic

- Simulation estimation of the energy consumption
- Collect the data for business model

M23: Prototype marketing in Light & Built Frankfurt 2020 (8 to 13th March)

- **Target group:** Light + Building is the world's leading trade fair for lighting and building services technology having approximately 220.000 visitors and 2.700 exhibitors across the world.
- **Location:** Messe Frankfurt Exhibition, Germany
- **Duration:** 6 days
- **Key themes:** Product/market fit evaluation for global markets
- **Methods:** Sample unit and preliminary marketing materials relating leasing service will be displayed at the Kosnic trade show stand. Feedback is collected via paper/online survey and open ended-semi-structured interviews

M18: Marketing campaign with FM to find end-customers

- Interviews Facility Managers + questions for end-user companies

M24: Small patch case study

- **Target group:** The most potential piloting customers defined based prior Living Lab activities
- **Location:** UK
- **Duration:** TBC
- **Key themes:** Real life testing of the marketing, installation and maintenance operations
- **Methods:** Sample unit and preliminary marketing materials relating leasing service will be displayed at the Kosnic trade show stand. Feedback is collected via paper/online survey and open ended-semi-structured interviews

8.3 DEMO 2: Tablet recycling plan

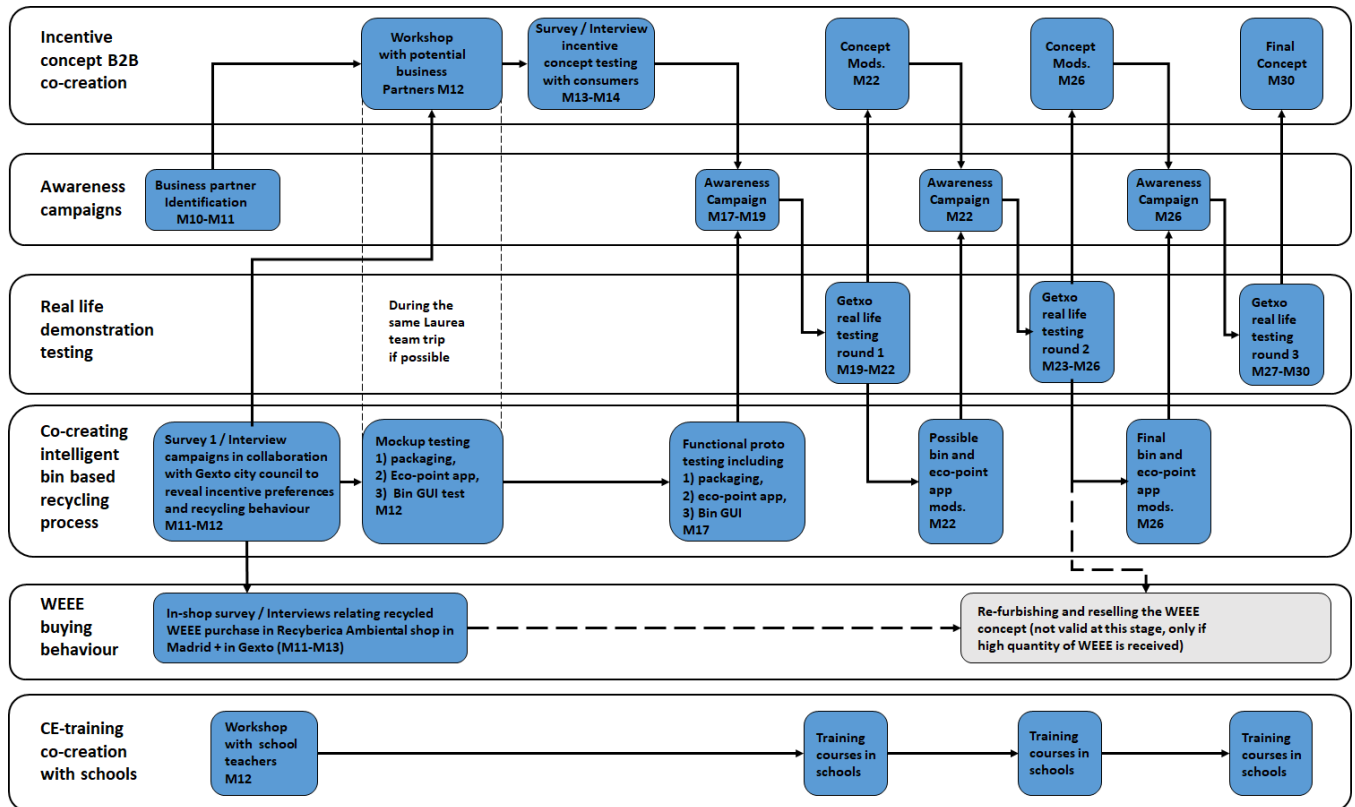


Figure 15: Tablets, Living Lab process timeline

M11-M12: Survey 1 – Consumer preferences relating recycling and buying WEEE

- **Timing / Duration:** March to April 2019
- **Methods:** Online survey (and limited amount of semi-structured interviews if needed)
- **Target groups:** Different kinds of consumers especially in Getxo
- **Key themes:** 1) Respondent demographic profile, 2) generic recycling / sustainability attitude, 3) personal / family recycling profile including EU based WEEE classification, 4) understandability of the eco-point application based recycling process, 5) preferences for WEEE collection point locations, opening hours and days, 6) preferences for incentive types (+ which partners giving the incentive) and payment speed, 7) interest to buy recycled /refurbished WEEE devices including low vs. high-end devices, 8) existence of the original WEEE product packages
- **Additional info:** Survey is conducted in collaboration with Gexto city council. Survey monkey cost is covered by Living Lab budget. In the case of low response rate, there is a possibility to cover small “lottery rewards” among those who have response. Furthermore, in the case of receiving only limited amount of responses interviews are possible.

M11-M13: In-shop survey – Consumer preferences relating recycling and buying recycled WEEE products

- **Timing / Duration:** March to May 2019
- **Methods:** In-shop survey (and limited amount of semi-structured interviews if needed)
- **Target groups:** Recyberica Ambiental WEEE shop customers

- **Key themes:** Same as Survey 1
- **Additional info:** Survey is conducted in collaboration with Recyberica Ambiental WEEE shop in Madrid. Survey monkey cost is covered by Living Lab budget. In the case of low response rate, there is a possibility to cover small “lottery rewards” among those who have response. Furthermore, in the case of receiving only limited amount of responses, additional in-shop interviews are possible.

M10-M11: Business partner identification / Interviews

- **Timing / Duration:** February to March 2019
- **Methods:** Direct contacts by telephone or face-to-face
- **Target group:** Companies who are Basque eco-design centre partners and having direct consumer customer (e.g. Eroski = Retail, Esukalel = Teleoperator, Iberdrola = Energy company). For more information see <http://www.basqueecodesigncenter.net>
- **Key themes:** 1) attitudes towards collaborative incentive system, 2) Interest to become incentive partner for WEEE recycling
- **Additional info:** In collaboration with Basque eco-design centre personnel

M12: Workshop with incentive business partners

- **Timing / Duration:** April 2019
- **Methods:** Workshop 1 (or 1.5 days)
- **Target group:** Companies who are Basque eco-design centre partners and having direct consumer customer (e.g. Eroski = Retail, Esukalel = Teleoperator, Iberdrola = Energy company). For more information see <http://www.basqueecodesigncenter.net>
- **Key themes:** 1) Co-creating an incentive system in which consumer can gain various benefits from business partners when they recycle their WEEE products, 2) in return business partners get “emission compensation” on the basis of recycled WEEE product and/or get part of the revenue which is gained by recycling WEEE products
- **Additional info:** In collaboration with Basque eco-design centre personnel and if possible with Basque Country public authorities.

M13-M14: Survey 2 – Incentive scheme acceptance

- **Timing / Duration:** May to June 2019
- **Methods:** Online survey (and limited amount of semi-structured interviews if needed)
- **Target groups:** Different kinds of consumers especially in Getxo
- **Key themes:** Similar as Survey 1, but having more in-depth incentive concept description and true-to-life incentive examples.
- **Additional info:** Survey is conducted in collaboration with Gexto city council and possibly with business partners. Survey monkey cost is covered by Living Lab budget. In the case of a low response rate, there is a possibility to cover small “lottery rewards” among those who have responded. Furthermore, in the case of receiving only limited amount of responses interviews are possible.

M18: Intelligent bin mockup test

- **Timing / Duration:** October 2019
- **Methods:** Use case scenario simulation with paper based or electronic mockups
- **Target groups:** Different kinds of consumers especially in Getxo
- **Key themes:** 1) Easy of use and understandability of the eco-point application based intelligent bin recycling process, 2) Eco-point application functionality test, 3) incentive selection test (i.e. participants

can select a reward which are similar than they would be in the case of full production system), 4) packaging guideline test

- **Additional info:** Limited possibility to cover small rewards for those who are participating if needed.

M17: Intelligent bin full prototype simulation test

- **Timing / Duration:** September 2019
- **Methods:** Use case scenario simulation with fully functional intelligent bin
- **Target groups:** Different kinds of consumers especially in Getxo
- **Key themes:** 1) Ease of use and understandability of the eco-point application based intelligent bin recycling process, 2) Eco-point application functionality test, 3) Incentive selection test (i.e. participants can select a reward which are similar than they would be in the case of full production system), 4) packaging guideline test
- **Additional info:** Limited possibility to cover small rewards for those who are participating if needed.

M17-M19, M22, M26: Awareness campaigns 1,2, and 3

- **Timing / Duration:** Campaign 1: September to November 2019, Campaign 2: February 2020, and Campaign 3: June 2020
- **Methods:** Awareness raising / marketing campaign to participate in recycling
- **Target groups:** Different kinds of consumers in Getxo and nearby
- **Key themes:** 1) eco-point based recycling system concept description, 2) incentives schemes, 3) locations and timing where recycling is occurring
- **Additional info:** In collaboration with Gexto city council. Each campaign will notify the feedback and observations from other activities and fine tune the message accordingly.

M19-M22: Intelligent bin demonstration Round 1

- **Timing / Duration:** November 2019 to February 2020
- **Methods:** Real life demonstration. Multiple data collection methods including observation, survey and interviews
- **Target groups:** Different kinds of consumers in Getxo and nearby
- **Key themes:** 1) Ease of use and understandability of the eco-point application based intelligent bin recycling process, 2) incentive selection preferences (if multiple options are available), 3) failure rate analysis, 4) location impact analysis, 5) daily and hourly usage analysis
- **Additional info:** Demonstration round can lead to concept and recycling process changes based on demonstration findings. Small scale workshops are possible if needed.

M23-M26: Intelligent bin demonstration Round 2

- **Timing / Duration:** March 2020 to June 2020
- **Methods:** Real life demonstration. Multiple data collection methods including observation, survey and interviews
- **Target groups:** Different kinds of consumers in Getxo and nearby
- **Key themes:** Same as round 1, but with improved solution
- **Additional info:** Demonstration round can lead to concept and recycling process changes based on demonstration findings. Small scale workshops are possible if needed.

M27-M30: Intelligent bin demonstration Round 2

- **Timing / Duration:** July 2020 to October 2020
- **Methods:** Real life demonstration. Multiple data collection methods including observation, survey and interviews
- **Target groups:** Different kinds of consumers in Getxo and nearby
- **Key themes:** Similar as round 1 and 2, but with improved solutions and alternative locations. Includes replications test to verify previous results.
- **Additional info:** Demonstration round can lead to concept and recycling process changes based on demonstration findings. Small scale workshops are possible if needed.

M12: CE-training co-creation workshop with schools

- **Timing / Duration:** April 2019
- **Methods:** Workshop
- **Target groups:** Getxo school teachers and students
- **Timeline:** Meetings with schools starting at February, planning completed before June, and execution from August onwards,
- **Key themes:** 1) increasing knowledge about circular economy and recycling, 2) recycling campaign or competition with school from different districts, 3) How, when and where to use low end tablets

M12: CE-training courses and co-creation workshops 1, 2, and 3 with schools

- **Timing / Duration:** Autumn period 2019, Spring period 2020 and Autumn period 2020
- **Methods:** Classroom teaching and onsite visits
- **Target groups:** Getxo school teachers and students
- **Key themes:** 1) Increasing knowledge about circular economy and recycling, 2) How, when and where to use low-end recycled tablets in schools, 3) brainstorming new ideas for WEEE recycling, 4) recycling competition with school from different districts, by applying the best new WEEE ideas

8.4 DEMO 3: Micro farming plan

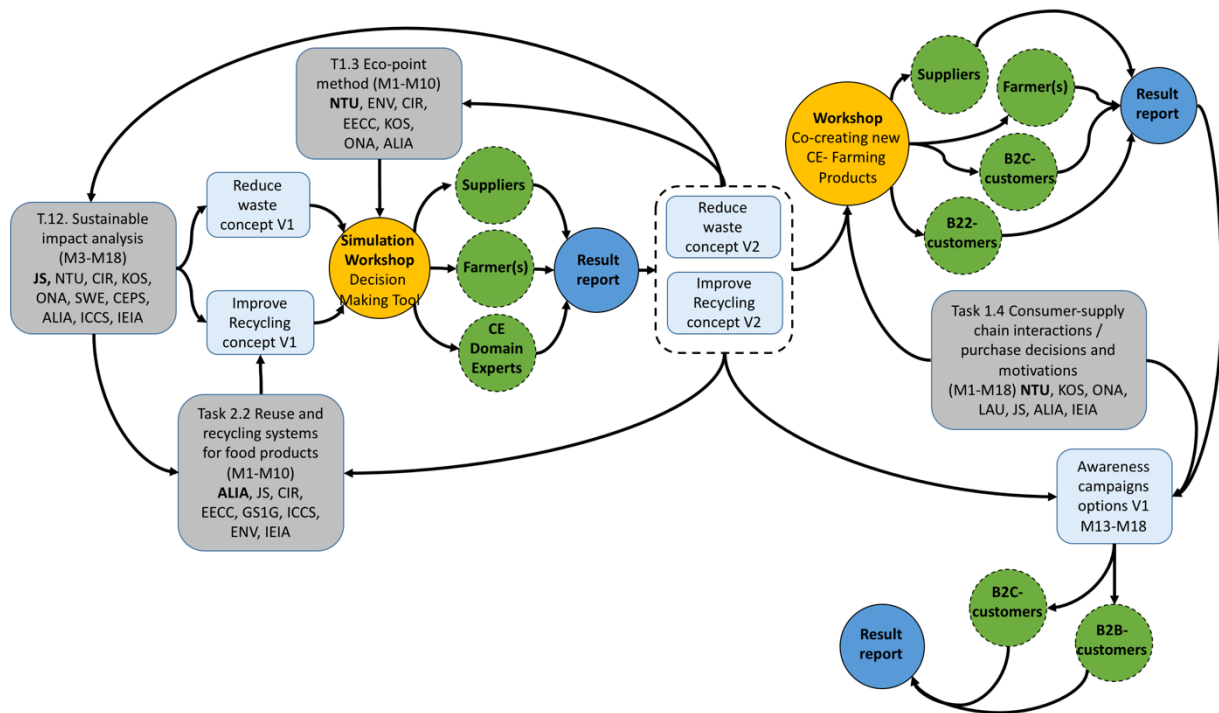


Figure 16: Micro farming, Living Lab process

Community compost solution

MAIN IDEA: Community composting is a crowdsourced waste model in which local consumers, business partners and other relevant stakeholders are storing their bio waste into a single communal compost. The main idea of the communal compost is to scale-up the amount of available bio waste for micro farming purposes. The composted bio waste is planned to be used for restoration purposes – a process where biological nutrients are returned to the soil after break-down by micro-organisms and other species.

OPEN QUESTIONS: 1) How to engage and motivate the local community to use communal compost, 2) how to arrange and manage cost effective and environmentally-friendly bio waste collection

APPLICABLE LIVING LAB METHODS: 1) Interviews for identifying motivation and interest, 2) co-creation workshops developing the concept, 3) prototyping for testing the usability, 4) observation and self-reporting for validating the actual usage.

LINKS TO RELEVANT CE-STRATEGIES: 1) Community involvement, 2) Incentivized recycling, 3) Logistics/Infrastructure building, 4) Separation, 5) Restoration

M11: Interviews with local business partners and B2B-customers

- **Target group:** Scilly Organics existing local business partners and customers located in the Scilly islands.
- **Location:** Business partner or customer premises
- **Duration:** 30 minutes to one hour per interview
- **Key themes:** 1) Attitudes, preferences and needs relating to sustainable food products in general, 2) willingness to intensify collaboration and apply eco-point solutions (at least partially), 3) identifying new ideas for sustainable food products and other similar business opportunities, 4) initial responses to communal compost concept including the recruitment for follow-up co-creation workshop

- **Methods:** Semi-structured open-ended interviews.

M12-M17: Online survey 1 for consumer

- **Target group:** Consumers including local people and tourists visiting in Scilly islands
- **Location:** Link to online survey presented in Scilly Organics shop and website
- **Duration:** During the high season starting from M12 to M17
- **Key themes:** 1) General attitudes, values and preferences towards sustainable food products, 2) attitudes, understanding and acceptance relating eco-point solution, 3) preferences and ranking possible product alternatives.
- **Methods:** Online survey

M12-M17: Prototyping the LCA data collection process in real life farming setting

- **Target group:** Scilly islands / Jonathan Smith
- **Location:** Scilly Organics premises
- **Duration:** From growing season (M12) to harvest season (M17)
- **Key themes:** 1) Prototyping the LCA data collection process according the defined LCA process and guidelines
- **Methods:** Prototyping in real life setting

M15: Impact analysis tool simulations based in real LCA data

- **Target group:** Scilly islands / Jonathan Smith
- **Location:** Scilly Organics premises
- **Key themes:** 1) Usefulness and ease-of-use testing of the impact analysis tool, 2)
- **Methods:** 1) Running calculation simulations for different product options based real LCA data while using think a loud method.

M15: LCA impact analysis tool and eco-point solution workshop with micro farmers

- **Target group:** Micro farmers
- **Location:** TBC
- **Duration:** One day
- **Key themes:** 1) Usefulness and ease-of-use testing of the impact analysis tool, 2)
- **Methods:** 1) Running calculation simulations for different product options based real LCA data while using think aloud method.

8.5 DEMO 4: Meat product plan²

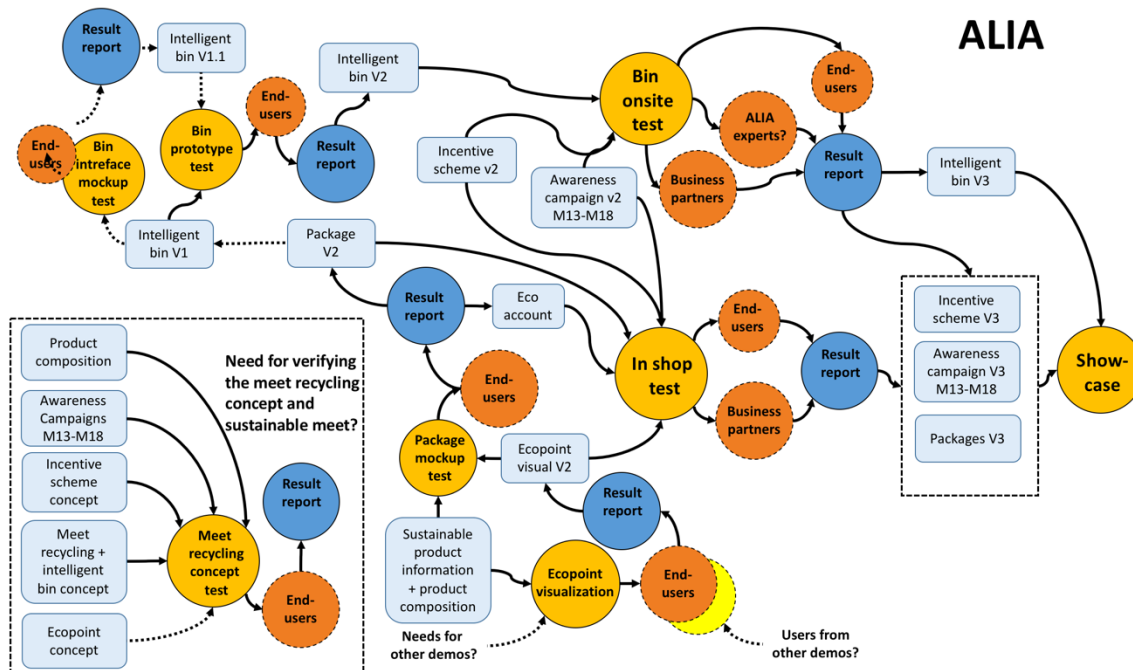


Figure 17: Meat product, Living Lab process

M11: Visualizing sustainable information of products/eco-information

- **Timing / Duration:** March 27-28th 2019, Finland
- **Methods:** Circular Economy Jam
- **Target groups:** End-users (students, staff members, CE experts)
- **Key themes:** To show the sustainable information (eco-points) of products in different ways: package (also different prototypes in here), app, in the supermarket self, etc; To include (if positive) information of products possibilities of recycling and other sustainable/practical information.

M12 - M19: Participation in co-creation activities

- **Target group:** End -consumers. People. Consumer associations, students. Suppliers
- **Location:** Lorca / Region of Murcia
- **Duration:** April 2019 - November 2019, one-day workshops x 2
- **Key themes:** 1) To show different stages of the whole supply chain in order to make participant decide which steps have more importance for the sustainability of the final product, 2) To show the impact we have calculated from each of supply chain elements in order to confirm if participants have the same opinion; 3) To show different products composition and get participants feedback of which are the most sustainable ones, 4) To show all ALIA's (or a typical company from the sector) suppliers in order to make people select which are the most important ones for green procurement
- **Methods:** Workshops

M17-M20: Intelligent bin full prototype simulation test

- **Timing / Duration:** September – November 2019

² The Main Living Lab activities will be revised during the face-to-face meeting in Spain on 25th February 2019

- **Methods:** Use case scenario simulation with fully functional intelligent bin
- **Target groups:** Different kinds of consumers
- **Key themes:** To show different intelligent bins prototypes with different interfaces and study how people interact with them. 1) Ease-of-use and understandability of the eco-point application based intelligent bin recycling process, 2) Eco-point application functionality test, 3) Incentive selection test (i.e. participants can select rewards that are similar to what they would be in the case of full production system), 4) Packaging guideline test

M19: Incentive scheme acceptance

- **Timing / Duration:** September – October 2019
- **Methods:** surveys and interviews if possible
- **Target groups:** End consumers
- **Key themes:** Testing different incentive concepts; attitudes towards incentive schemes, preferences for incentive types

M 20-22: Small scale testing of packaging with eco-information

- **Timing / Duration:** Dec 2019 – Feb 2020
- **Methods:** Simulation in a supermarket in Spain (tbd), various data collection methods via observations, interviews etc
- **Target groups:** End consumers
- **Key themes:** Eco-information attractiveness and impact on sustainable consumption; product placement analysis, analysis of customer preferences

M17-M19, M22, M26: Awareness campaigns 1,2, and 3

- **Timing / Duration:** Campaign 1: September to November 2019, Campaign 2: February 2020, and Campaign 3: June 2020
- **Methods:** Awareness raising / marketing campaign to participate in recycling
To propose different ways and resources to develop awareness campaigns (for the whole circular economy cycle: social media, videos, NGOs, newspaper, radio etc)
- **Target groups:** Different kinds of consumers, general public
- **Key themes:** 1) eco-point based recycling system concept description, 2) incentives schemes, 3) locations and timing where recycling is occurring
- **Additional info:** Each campaign will notify the feedback and observations from other activities and fine tune the message accordingly.

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